UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,270	11/09/2001	Carl Cavanagh	5181-96200	2609

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Lawrence J. Merkel
Conley, Rose, & Tayon, P.C.
P.O. Box 398
Austin, TX   78767

EXAMINER
PROCTOR, JASON SCOTT

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/008,270	CAVANAGH ET AL.
	Examiner	Art Unit	
	Jason Proctor	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>26 November 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>09 November 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date <u>2/25/02</u>.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claims 1-29 have been presented for examination.

Claims 1-29 have been rejected.

Request for Status

The Examiner acknowledges Applicant's request for status of the instant

application received by the Office on November 26, 2004. The Examiner presumes that

this office action is a sufficient indication of the status of the application and deems no

further action necessary.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created
doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the
unjustified or improper timewise extension of the "right to exclude" granted by a patent
and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11
F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225
USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA
1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,*
418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be
used to overcome an actual or provisional rejection based on a nonstatutory double
patenting ground provided the conflicting application or patent is shown to be commonly
owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a
terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with
37 CFR 3.73(b).

1.   Claims 1 and 12 are provisionally rejected under the judicially created doctrine of

double patenting over claims 1 and 27 of copending Application No. 10/008,255. This is

a provisional double patenting rejection since the conflicting claims have not yet been patented.

The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows: a distributed simulation system comprising two nodes, each node using a different simulator program ("simulation mechanism"), wherein the first node and the second node communicate using a grammar.

Claim 12 of the instant application recites the method employed by the apparatus of claim 27 of the copending application.

Claim Rejections - 35 USC § 101

35 U.S.C. § 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2.   Claims 1-29 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter.   MPEP 2106 reads as follows (emphasis added):

> A claim that requires one or more acts to be performed defines a process.   However, not all processes are statutory under 35 U.S.C. 101. *Schrader*, 22 F.3d at 296, 30 USPQ2d at 1460. **To be statutory, a claimed computer-related process must either: (A) result in a physical transformation outside the computer** for which a practical application in the technological arts is either disclosed in the specification or would have been known to a skilled artisan (discussed in i) below), **or (B) be limited to a practical application within the technological arts** (discussed in ii) below).   See *Diamond v. Diehr*, 450 U.S. at 183-84, 209 USPQ at 6 (quoting *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1877))

and

> For such subject matter to be statutory, the claimed process must be limited to a practical application of the abstract idea or mathematical algorithm in the technological arts. See *Alappat*, 33 F.3d at 1543, 31 USPQ2d at 1556-57 (quoting *Diamond v. Diehr*, 450 U.S. at 192, 209 USPQ at 10). See also *Alappat* 33 F.3d at 1569, 31 USPQ2d at 1578-79 (Newman, J., concurring) ("unpatentability of the principle does not defeat patentability of its practical applications") (citing *O 'Reilly v. Morse*, 56 U.S. (15 How.) at 114-19). **A claim is limited to a practical application when the method, as claimed, produces a concrete, tangible and useful result;** i.e., the method recites a step or act of producing something that is concrete, tangible and useful. See *AT&T*, 172 F.3d at 1358, 50 USPQ2d at 1452. Likewise, a machine claim is statutory when the machine, as claimed, produces a concrete, tangible and useful result (as in *State Street*, 149 F.3d at 1373, 47 USPQ2d at 1601) and/or when a specific machine is being claimed (as in *Alappat*, 33 F.3d at 1544, 31 USPQ2d at 1557 (in banc). For example, a computer process that simply calculates a mathematical algorithm that models noise is nonstatutory. However, a claimed process for digitally filtering noise employing the mathematical algorithm is statutory.

The invention of claims 1-11 recites a distributed simulation system that could be embodied as software within a single computer apparatus. As such, the claimed invention does not result in a physical transformation outside the computer. Further, the claimed invention results in "the first node and second node communicate at least signal values during the simulation using a grammar", which does not constitute a concrete, tangible, and useful result. As such, the invention of claims 1-11 is directed to nonstatutory subject matter.

The Examiner respectfully suggests specifically claiming that the first and second node are embodied on separate computers, whereby communication between the nodes is expressly recited as communication between computers. Such limitations would establish that the invention results in data communication between computer systems, thus a physical transformation outside the computer.

The invention of claims 12-22 recite the method employed by the system of claims 1-11 and are directed to nonstatutory subject matter for at least the reasons given above regarding claims 1-11.

Claims 23-29 recite "a carrier medium" comprising various computer software components. The specification (page 45, lines 23-29) teaches that a carrier medium is, among other definitions, "transmission media or signals such as electrical, electromagnetic, or digital signals, conveyed via a communication medium such as a network and/or a wireless link." This use of the term "carrier medium" establishes that a carrier medium is not tangible. As such, claims 23-29 recite computer software that is not tangibly embodied on a computer readable medium.

The Examiner respectfully suggests claiming the inventions of claims 23-29 as tangibly embodied on a computer readable medium, not including a "carrier medium" as defined by the specification.

To expedite a complete examination of the instant application the claims rejected under 35 U.S.C. § 101 (nonstatutory) above are further rejected as set forth below in anticipation of applicant amending these claims to place them within the four statutory categories of invention.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4.   Claims 1, 7, 8, 12, 18, and 19 are rejected under 35 U.S.C. 102(b) as being

anticipated by US Patent No. 5,901,903 to Feinberg et al. (Feinberg).

Regarding claim 1, Feinberg teaches a distributed simulation according to the

claimed invention.   In particular, Feinberg teaches a distributed simulation with a

plurality of nodes, the nodes are configured to simulate portions of a system under test,

the simulator programs on different nodes use different instruction code, and the nodes

communicate during the simulation (Figs. 2-4; column 3, lines 38-46; column 4, lines 48-

67).   Official notice is taken that instruction code for the Windows NT™ operating

system differs from instruction code for the Sun Solar 15™ operating system.   Official

notice is taken that computer programs communicate using a grammar.

Additionally, although this feature is not specifically claimed, Feinberg teaches

"simulation agnosticity" by exhibiting "Simulation component B" which operates on a

"black box", an unknown and unspecified simulation platform for measuring M1A1 tank

operations, yet nevertheless participates in the larger distributed simulation system.

5.   Regarding claim 7, Feinberg teaches that the nodes of the distributed simulation

system are configured to communicate. Feinberg teaches that it is known in the art to

establish communication in a distributed simulation (column 1, lines 13-16).   It is

inherent that computer data communication uses message packets. It is inherent that

computer data communication uses a grammar.

6.   Regarding claim 8, Feinberg teaches a computer control, constituting a hub, coupled to the simulation nodes, wherein the computer control is configured to route message packets (Fig. 2; column 5, lines 44-67; column 6, lines 12-20).

7.   Claims 12, 18 and 19 recite the method employed by the system of claims 1, 7, and 8, respectively, and are therefore rejected for the same reasons given above for claims 1, 7, and 8.

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-6, 13-17, and 23-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feinberg in view of "Handbook of Simulation", edited by Jerry Banks (Banks).

9.   Regarding claim 2, Feinberg does not explicitly teach whether the simulations shown are event-based simulations.   However, Banks teaches that event-based simulations are well known in the art (§1.4.2, page 9, Event-Scheduling Method).   It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to use simulation techniques well known in the art, such as those found in a handbook of simulation, to design a simulation.   Therefore it would have been obvious

to build a distributed simulation system as taught by Feinberg, using event-based simulations. Motivation to do so would be found in the nature of the problem, such as the nature of the system for which the simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

10.   Regarding claim 3, Feinberg does not explicitly teach that the first simulator and the second simulator have different event schedulers. However, Feinberg does teach that the simulations are embodied on different operating systems (Fig. 2, Windows NT™ operating system and Sun Solar 15™ operating system). Feinberg does teach that the operating systems are multitasking operating systems (column 7, lines 5-19). Official notice is taken that multitasking operating systems use schedulers to obtain process concurrency and that various scheduling algorithms are known in the art.

Further, Banks teaches the concept of *validation*, which asks whether the conceptual model (simulation) is an accurate representation of the real system (§ 1.7, page 17, 7. *Validated?*). It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to use different schedulers for different event-based simulations in order to uphold principles well known in the art, such as those found in a handbook of simulation. Therefore it would have been obvious to build the distributed simulation system as taught by Feinberg, using event-based simulations with the particular scheduler that accurately represents the real system and therefore adheres to the principle of *validation* as taught by Banks. Motivation to do so would be found in the nature of the problem, such as the nature of the system for which the

simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

11.   Regarding claim 4, the specification (page 24, lines 25) teaches a "non-blocking assignment" as "The non-blocking assignment event is an assignment of a signal value to a signal. Thus, the non-blocking assignment event may change the value of a signal, and may generate additional events which change signal values." Although Feinberg does not explicitly teach simulating a "non-blocking assignment", Banks teaches the concept of *validation*, which asks the conceptual model (simulation) is an accurate representation of the real system (§ 1.7, page 17, 7. *Validated?*). When the nature of the problem to be solved includes "non-blocking assignment", it would be obvious to a person of ordinary skill in the art at the time of Applicant's invention to incorporate "non-blocking assignment" in the simulation of such a system. Indeed, Applicant admits that "non-blocking assignment" is a known component of the IEEE 1364-1995 standard, therefore it would have been obvious to incorporate "non-blocking assignment" in a simulation of a device compliant with IEEE 1364-1995 in accordance with principles well known in the art, such as *validation* as taught by Banks. Motivation to do so would be found in the nature of the system for which the simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

12.   Regarding claims 5 and 6, Feinberg does not explicitly teach whether the simulations shown are event-based or cycle-based. However, Banks teaches that

cycle-based simulations are well known in the art (§ 1.4.3 Activity Scanning, page 9).

Activity scanning is regulated by time increments, thus cycle-based. It would have been

obvious to a person of ordinary skill in the art at the time of Applicant's invention to use

simulation techniques well known in the art, such as those found in a handbook of

simulation, to design a simulation. Therefore it would have been obvious to build a

distributed simulation system as taught by Feinberg, using event-based and/or cycle-

based simulations. Motivation to do so would be found in the nature of the problem,

such as the nature of the system for which the simulation is being designed, as well as

the knowledge of a person of ordinary skill in the art.

13.   Claims 13-17 recite the methods employed by the system of claims 2-6, and are

therefore rejected for the same reasons given above for claims 2-6.

        Claims 23-27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over

Feinberg in view of Banks.

14.   Regarding claims 23-27, Feinberg teaches a distributed simulation according to

the claimed invention. In particular, Feinberg teaches a distributed simulation with a

plurality of nodes, the nodes are configured to simulate portions of a system under test,

the simulator programs on different nodes use different instruction code, and the nodes

communicate during the simulation (Figs. 2-4; column 3, lines 38-46; column 4, lines 48-

67).

The specification (page 24, lines 25) teaches a "non-blocking assignment" as "The non-blocking assignment event is an assignment of a signal value to a signal. Thus, the non-blocking assignment event may change the value of a signal, and may generate additional events which change signal values." Although Feinberg does not explicitly teach simulating a "non-blocking assignment", Banks teaches the concept of *validation*, which asks the conceptual model (simulation) is an accurate representation of the real system (§ 1.7, page 17, 7. *Validated?*). When the nature of the problem to be solved includes "non-blocking assignment", it would be obvious to a person of ordinary skill in the art at the time of Applicant's invention to incorporate "non-blocking assignment" in the simulation of such a system. Indeed, Applicant admits that "non-blocking assignment" is a known component of the IEEE 1364-1995 standard, therefore it would have been obvious to incorporate "non-blocking assignment" in a simulation of a device compliant with IEEE 1364-1995 in accordance with principles well known in the art, such as *validation* as taught by Banks. Motivation to do so would be found in the nature of the system for which the simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

Feinberg does not explicitly teach whether the simulations shown are event-based or cycle-based. However, Banks teaches that cycle-based simulations are well known in the art (§ 1.4.3 Activity Scanning, page 9). Activity scanning is regulated by time increments, thus cycle-based. It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to use simulation techniques well known in the art, such as those found in a handbook of simulation, to design a

simulation. Therefore it would have been obvious to build a distributed simulation system as taught by Feinberg, using event-based and/or cycle-based simulations. Motivation to do so would be found in the nature of the problem, such as the nature of the system for which the simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

15.   Regarding claims 28-29, Feinberg teaches a distributed simulation according to the claimed invention. In particular, Feinberg teaches a distributed simulation with a plurality of nodes, the nodes are configured to simulate portions of a system under test, the simulator programs on different nodes use different instruction code, and the nodes communicate during the simulation (Figs. 2-4; column 3, lines 38-46; column 4, lines 48-67).

Feinberg does not explicitly teach whether the simulations shown are event-based or cycle-based. However, Banks teaches that cycle-based simulations are well known in the art (§ 1.4.3 Activity Scanning, page 9). Activity scanning is regulated by time increments, thus cycle-based. It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to use simulation techniques well known in the art, such as those found in a handbook of simulation, to design a simulation. Therefore it would have been obvious to build a distributed simulation system as taught by Feinberg, using event-based and/or cycle-based simulations. Motivation to do so would be found in the nature of the problem, such as the nature of

the system for which the simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

Claims 9-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Feinberg as applied to claim 7 above and further in view of "Concepts of Programming Languages" by Robert Sebesta (Sebesta).

16.   Regarding claims 9-11, these claims describe the grammar by which Applicant's simulation nodes communicate.   Official notice has been taken regarding the use of grammars for computer communication.   See Sebesta, chapter 3.   The use of a grammar for computer communication is so well known that the Examiner is unaware of any computer communication protocol that does not use a grammar.   The details of implementation in a grammar would have been obvious to a person of ordinary skill in the art in combination with his own knowledge of the particular art.   Motivation for designing a grammar that enables the invention to function as intended would be found in the nature of the particular problem to be solved by the invention as well as the knowledge of a person of ordinary skill in the art.

Claims 20-22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Feinberg as applied to claim 19 above and further in view of "Concepts of Programming Languages" by Robert Sebesta (Sebesta).

17.   Regarding claims 20-22, these claims describe the grammar by which Applicant's simulation nodes communicate.   Official notice has been taken regarding the use of grammars for computer communication.   See Sebesta, chapter 3.   The use of a grammar for computer communication is so well known that the Examiner is unaware of any computer communication protocol that does not use a grammar.   The details of implementation in a grammar would have been obvious to a person of ordinary skill in the art in combination with his own knowledge of the particular art.   Motivation for designing a grammar that enables the invention to function as intended would be found in the nature of the particular problem to be solved by the invention as well as the knowledge of a person of ordinary skill in the art.

Claims 1-29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Feinberg et al. in view of US Patent No. 5,991,533 to Sano et al. (Sano).

18.   Feinberg teaches a distributed simulation system which anticipates the structure of the claimed inventions of 1-29.   Feinberg teaches several applications for this distributed simulation system, and it would be obvious to a person of ordinary skill in the art at the time of Applicant's invention that Feinberg's distributed simulation is suitable for verification of electronics.   The dependent claims recite details of implementation that would have been obvious to a person of ordinary skill in the art of simulation and verification when developing a verification tool for a particular application.

Additionally, Sano teaches a verification system for, among other things, IEEE-1364 (column 24, lines 49-59). The dependent claims recite details of implementing a verification of a device conforming to IEEE-1364 specifications. It would have been obvious to a person of ordinary skill in the art combine the teachings of verifying an IEEE-1364 device, taught by Sano, with a distributed simulation system, taught by Feinberg. This combination would be an application or intended use for the distributed simulation system of Feinberg. Motivation to do so would be found in the nature of the problem to be solved, as verification and simulation are well known to be computationally intensive and distributed computing systems are well known to have advantages in this regard.
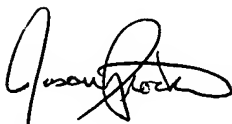
Conclusion

Art considered pertinent by the examiner but not applied has been cited on form PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Proctor whose telephone number is (571) 272-3713. The examiner can normally be reached on 8:30 am-4:30 pm M-F.
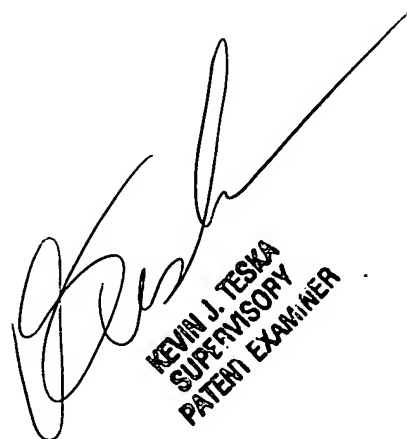
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J Teska can be reached on (571) 272-3716. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason Proctor
Examiner
Art Unit 2123

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